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Maximising the Impact of Knowledge for Innovation in Gaining Competitive Advantage

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Due to the global nature of today's trading environment, it is vital that firms work to develop dynamic capabilities enabling them to stay ahead of competitors. Innovation is widely accepted as being a source of sustainable competitive advantage. However, many organisational approaches to innovation are haphazard at best. Tacit knowledge, that which resides in human beings and is embedded in organisational routines, has also been identified as a source of advantage. The implicit nature of such knowledge often makes it difficult to harness and exploit for organisational benefits. Evidence would suggest that there is a symbiotic relationship between knowledge management and the capacity of the organisation to innovate. The paper aims to explore the relationship between the two in more depth to facilitate the use of knowledge and innovation as a means of gaining and sustaining competitive advantage.

Keywords: competitive advantage, innovation, knowledge management, tacit knowledge.

INTRODUCTION

The aim of this paper is to explore the relationship between knowledge management and innovation in organisational settings. Each is an important topic in their own right, and whilst it is generally accepted that well-managed knowledge facilitates innovation, the relationship between the two has not yet been fully explored in existing writings.

In his resource-based view of the firm, Barney (1991) suggests that sustained competitive advantage derives from the resources and capabilities that a firm possesses that are valuable, rare, imperfectly imitable and non-substitutable. One of the rarest assets that a firm can be said to possess is that of its people and the unique combination of knowledge and accumulated learning inherent in them. Such knowledge can be viewed as an inimitable asset that can contribute directly to the resources of the firm. Whilst the traditional factors of production, such as land, capital and labour were previously thought to be the main source of advantage, Quinn (1993) believes that the main economic and producing power of a corporation lies in its intellectual and service capabilities, as opposed to these traditional factors. This lends weight to the idea that knowledge is an essential means of sustaining competitive advantage. Indeed it has been said that the only sustainable advantage of an organisation is what people know and what they do with it (Civi, 2000). Knowledge has been termed *the* resource as oppose to *a* resource.

According to Amidon (2002), the foundation for a new world order has been laid; one based on knowledge and innovation (Amidon, 2002). Innovations based on the knowledge of organisational members prove valuable as they are unique to the originating organisation. The relationship between knowledge management and innovation is truly symbiotic. Without people's knowledge it would not be possible for innovation to exist. Nor would innovation be possible without the effective utilisation of

knowledge. For this reason, knowledge must be managed effectively in order to become translatable and, in turn, valuable currency upon which an organisation can trade.

One of the main objectives of the study is to develop a conceptual model highlighting the dynamics between knowledge management and innovation and the role they play in contributing to organisational effectiveness. Early frameworks are proposed in this paper.

REVIEW OF LITERATURE

KNOWLEDGE DEFINED

Knowledge, by its very nature, originates with, and resides in human beings. Despite many advances in technology, it is not possible to create knowledge without first needing the input of a human being. For this reason it is not yet possible to replicate, perfectly, the human component of knowledge. In an increasingly technological age this essential part of knowledge sustains the practice. Whilst the human element of knowledge directly contributes to both the purity and beauty of knowledge, it also adds to the complexity of knowledge.

Knowledge can be defined along two dimensions: explicit or tacit. Explicit knowledge is of a rather 'explicit' and discrete type (Civi, 2000). It can be codified and thus is relatively easy to communicate. The other dimension to knowledge is tacit knowledge and it is this dimension that presents more problems. Tacit knowledge is highly personal and hard to formalise, difficult to communicate with others and is deeply rooted in individual actions and experience, as well as ideals, values and emotions (Nonaka and Takeuchi, 1995). As tacit knowledge is so deeply rooted there is the danger that it can become embedded within the person instead of being put to wider use. When asked to describe how they know what they know, individuals may find this hard. This is because when things are deeply learnt they become almost second nature to the individual and therefore cannot be easily communicated. This would not present a problem if individuals lived in isolation, but as we are increasingly required to work together in a cohesive way then internalisation of knowledge is a barrier to communication and, in turn, progress.

Tacit knowledge can be further subdivided into two dimensions: technical and cognitive (Polyani, 1962). The cognitive dimension tends to be related to working knowledge and is often termed 'know-how' (Nonaka and Takeuchi, 1995). A person may be able to do their job to a high standard but when asked may not be able to explain the actual working behind how it is done. This would indicate that tacit knowledge is closely linked to intuition. The 'soft' element of intuition is defined by Reber (1989) as being

to have an intuitive sense of right and proper, to have a vague feeling of the goal of an extended process of thought, to 'get the point' without really being able to verbalise what one has gotten, is to have gone through an implicit learning experience and have built up the requisite knowledge base to allow for such a judgement.

Intuition has also been described as the internalisation of explicit knowledge (Civi, 2000). In this context it would be possible to view intuition as the transformation of what was once the explicit to the implicit. However, intuition can also be the internalisation of implicit knowledge, in that implicit knowledge can become even more deeply embedded within the individual.

The second dimension of tacit knowledge is the cognitive dimension and it is this area that presents the greater number of complexities. The cognitive dimension is closely related to the schema, mental models, beliefs and perceptions of an individual. As these are shaped over the duration of a lifetime they are both highly specific and personal to the holder. In an organisational setting the cognitive dimension of tacit knowledge will have a direct bearing upon the capacity of the individual and, in turn, the organisation to store, disseminate and share knowledge.

It can be seen that the management of tacit knowledge is not easy as it depends firstly on identifying where and within whom the knowledge resides. Secondly, the drawing up of tacit knowledge depends not only on the willingness of the individual within whom the knowledge resides, but also on the ability of the individual to communicate their knowledge effectively. Therefore it can be said that there are a number of parameters affecting the effective flow of knowledge across an organisation.

KNOWLEDGE MANAGEMENT

It is not simply enough for knowledge to reside within an organisation, as knowledge that is not effectively utilised is essentially a wasted resource. Instead, knowledge needs to be actively managed. There are several mechanisms that can be used to manage organisational knowledge. In recent years technology has greatly aided the formal capture and storage of information. Amistead (1999) suggests that there are four types of technology to be considered in this field: databases; decision support tools and artificial intelligence; groupware including email and videoconferencing; and intranet. However, a note of caution should be introduced here as the existence of such technology does not in itself guarantee that knowledge is either well managed or utilised. Such pieces of technology should not be seen as an end in themselves. Technology should only be viewed as a support tool enabling an organisation to develop systems through which knowledge can be managed more effectively. Armistead (1999) goes on to suggest that there is a direct relationship between the type of knowledge and the appropriate technology channel through which it can be communicated. Scientific and explicit knowledge can be conveyed using databases, whilst it is thought that more social and tacit knowledge would be better communicated thorough the use of web technology.

One feasible means of coordinating, simplifying, highlighting and navigating through complex silos of information can be via the use of knowledge mapping (Wexler, 2001). Knowledge maps can be used to describe the location of various forms of knowledge; different types include competency maps, concept maps, casual maps and cognitive maps (Wexler, 2001). Knowledge maps tend to be more effective in the communication of explicit knowledge within an organisation. For a knowledge map to be truly effective it should be used to address some kind of complex problem or situation, as this enables the map to have a specific focus and measurable objectives, and hence allows it to be of real value. Knowledge maps also require the investment of time and therefore often require some kind of champion if they are to be well developed and reach their full potential.

Tacit knowledge needs to be handled differently. One suitable method of conveying tacit knowledge can be via storytelling mechanisms. These can also help to reinforce an open culture that is conducive to communication. However, storytelling can be hard to formalise and subsequently control. There is a danger that stories may be subject to a little exaggeration, resulting in a kind of ‘Chinese whispers’ effect. On the other hand, it would be fair to ask if this is always a bad thing, as stories can be used to boost staff morale and generate a certain spirit within an organisation. This is highlighted by the example of sportswear giant Nike, which runs a series of inductions when new members of staff start. During these sessions, several stories are told about the

founders of the organisation. Whilst these may not be strict verbatim truth, they do work to reinforce company values and make new staff feel welcome within an organisation, which in turn promotes a feeling of loyalty to the organisation. Storytelling may not be an appropriate means to transfer highly specific technical information that would require a high level of accuracy in the telling. This therefore reinforces the work of Amistead (1999) that states that the most appropriate form of knowledge communication will vary depending upon the type of knowledge to be conveyed.

All too often, knowledge management initiatives are seen as being ancillary to the day job. When this is the case, momentum is often lost and these drives tend to fail. For knowledge management to be seen as an essential, revenue-generating component, it often needs to have a specific champion assigned to it. However, Brand (1998) believes that knowledge management cannot be left to one or two individuals; it must permeate the entire fabric of an organisation and every department within a company.

PROBLEMS ASSOCIATED WITH KNOWLEDGE

Despite being a potentially beneficial asset, there are a number of problems associated with knowledge. The foremost of these is that before knowledge can be transformed into an asset it needs to be teased out from organisational members and then handled effectively. Knowledge has often been called power and for this reason some members of an organisation may be reluctant to share their knowledge. Those who are unwilling to share their knowledge may realise the advantage that their own, unique knowledge provides them with and may feel that their bargaining power could be diminished in some way by divulging what they know. There are also those that may not see any reason to share their knowledge; they may not understand the benefits that sharing knowledge could provide to the organisation as a whole. In a bid to overcome this, an organisation may consider incentives for knowledge sharing.

As previously mentioned, there are some who may be unable to share their knowledge, either as a result of knowledge sharing mechanisms not being in place or because they are unable to translate what they know into an easily communicable form. In such a situation, training mechanisms should be considered which would allow for the sharing of information.

The question also arises as to the location of knowledge within an organisation. As knowledge is largely unseen and often only manifest through a person's actions, there is the danger that the location of valuable knowledge, in terms of the individual within which it resides, may not be found. Therefore there needs to be some sort of platform, or mechanism, whereby all members of the organisation can share their knowledge. Only after it has been shared can a judgement be made as to its relative value in relation to organisational effectiveness.

Organisational knowledge can be said to be a dynamic capability as it has the capacity to both increase, or conversely, diminish. One way in which the knowledge base of an organisation would be adversely affected would be if individuals within whom key knowledge elements resided were to leave an organisation. In such a situation the transfer of knowledge assets can be minimised through exit interviews; however these can never fully compensate for the loss of human capital and the contribution they can make to organisational learning.

There is a large ethical debate surrounding the ownership of knowledge, this is particularly true in research intensive organisations. The matter of Intellectual Property, what should, and does belong to whom, is a contentious one and should be borne in mind when considering knowledge sharing.

INNOVATION DEFINED

This paper aims to examine the relationship between knowledge management and innovation. Therefore it would be helpful to define innovation and consider its contribution to the competitive advantage of an organisation. The study of innovation stretches back several decades. Many definitions of innovation have been proposed (Pierce and Delbecq, 1977; Shephard, 1967; Rogers, 1971; Marquis, 1969). At its simplest level it has been defined as the invention of something new (Pierce and Delbecq, 1977). Shephard defines innovation as being when an organisation learns to do something new that it did not know how to do before, and then proceeds to do it in a sustained way (Shephard, 1969). Three ideas emerge from these early definitions; firstly that innovation is closely linked to organisational learning; secondly that innovation can be planned; and thirdly that it can have a contextual basis. The idea of a context for innovation is supported further by Rogers (1995), who speaks of diffusion across a social system.

Subsequent definitions of innovation suggest that innovation should be of economic or social value (Marquis, 1969). Such an idea is supported further by Drucker (1985), who suggests that innovation can be the means by which an organisation creates new wealth-producing resources or endows existing resources with the enhanced potential for creating new wealth (Drucker, 1985).

Having considered the above, it can be said that an operational definition for innovation in the context of organisations should include the following components: a social context for innovation; innovation as the introduction of something new; and the intention of benefit to the adopting entity. The definition provided by West and Farr includes all three of these vital components and for this reason is the one that will be used to define innovation throughout this paper. They define innovation as being “the intentional introduction and application within a role, group or organisation of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the group, organisation or wider society” (West and Farr, 1990).

INNOVATION AS COMPETITIVE ADVANTAGE

Innovation has long been identified as a means of providing the organisation with competitive advantage. One of the earliest writers on this subject was Joseph Schumpeter who termed innovation as ‘creative destruction’, such was its industry shattering impact. Schumpeter’s work undoubtedly laid the basis for much of the current debate on competitive advantage. Competition is at the core of the success or failure of firms (Porter, 1985), thus innovation should be concerned with enabling a firm to compete more effectively. The pursuit of competitive advantage is at the heart of much of the strategic management literature (Fahy, 2000). Competitive advantage is defined as: “when a firm sustains profits that exceed the average for its industry, it can be said to have a competitive advantage over its rivals” (Porter, 1985). Whilst competitive advantage can come from size, possession of assets and so forth, the pattern is increasingly coming to favour those organisations which can mobilise knowledge, technological skills and experience to create new products, processes and services (Tidd *et al*., 1997). What is being said here is that knowledge contributes directly to a firm’s capacity to innovate, which in turn can provide a distinct competitive advantage. Thus innovation is a critical element in the competitive struggle of both enterprises and nation states (Freeman and Soete, 1997). Innovation is an essential precursor to economic growth, as technological change (or innovation) contributes as strongly to economic growth and wealth creation as do the traditional factors of production: land, labour and capital (Utterback, 1994). Thus it can be said that the importance of innovation cannot be overestimated.

Not only can innovation be a means of creating competitive advantage, it can also be a means of maintaining competitive advantage depending upon a firm's position within an industry (Quintas, 1996). Industry newcomers tend to be more innovative than established firms and this is what often lends them new appeal. Such newcomers pose dangerous threats to existing firms within the arena, as most industry shattering innovations do not spring from established competitors within an industry, but rather from new firms (Utterback, 1994). Established players can hope to maintain their advantage through innovating, as not to innovate is to die (Freeman and Soete, 1997).

RELATIONSHIP BETWEEN KNOWLEDGE AND INNOVATION

Certain organisational variables have been identified as impacting directly upon the collective ability of an organisation to innovate. As these variables influence innovation, it is reasonable to expect that the same variables will also impact upon the knowledge management capabilities of an organisation. The key variables that are thought to have the greatest influence on organisational innovation are: size (Mansfield, 1963; Kimberley and Evanisko, 1981; Utterback, 1994), top management support (Shephard, 1967), organisational slack (Pierce and Delbecq, 1977; Rogers, 1983), culture (Schein, 1985; Kanter, 1984), structure (Van de Ven, 1989; Zaltman *et al*., 1973; Shephard, 1967) and age (Pierce and Delbecq, 1977; Kimberley and Evanisko, 1981). The current study aims to develop a model highlighting the relationship between innovation and knowledge management, whilst incorporating the effect of these variables on the two.

To be innovative in highly competitive and global industries requires the effective use of knowledge management (Brand, 1998). Both innovation and knowledge management require appropriate organisational culture and structure if they are to prosper. Knowledge repositories are needed to build a store of knowledge that can then be reactivated to contribute to innovation. Whilst the relationship between the two has been alluded to by many writers, it would appear that this avenue has not, as yet, been fully explored. It would seem that there is an assumption that they are mutually supportive; however this has not yet been empirically tested. The study aims to explore the relationship between the two in greater depth.

Just as knowledge can take explicit and easily translatable forms, innovation can also be tangible and measurable. The type of innovation that is the most explicit is product innovation, as its results are easily identifiable and measurable. There are, however, more implicit forms of innovation. Service innovations are perhaps the least explicit, whilst process innovations lie somewhere in the middle of the two. On this basis it is possible to develop a conceptual model showing the theoretical relationship between innovation type and the knowledge dimension supporting this. It is also possible to test this relationship through developing a hypothesis. A third component can further be introduced - innovative capacity. The innovative capacity of an organisation can be described as the collective ability of the organisation to innovate. The variables identified above can be expected to contribute to innovative capacity, as can knowledge management systems within the organisation. Innovative capacity can also be described as a dynamic capability as it can increase or diminish depending upon the variables surrounding it.

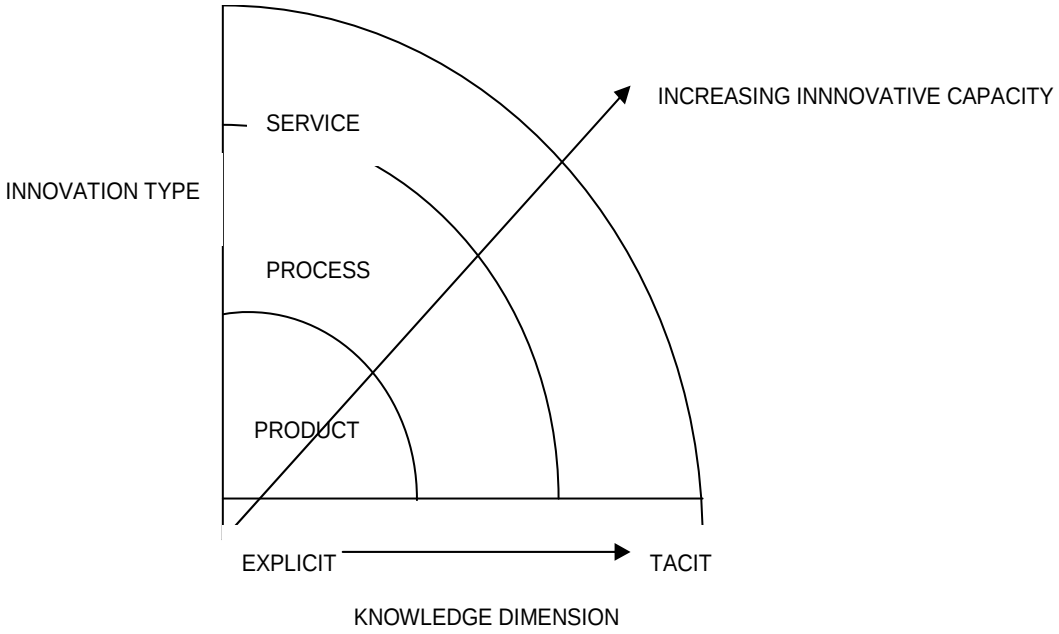


Fig. 1: Relationship between knowledge type and innovation type.

H1: The type of innovation produced by an organisation depends largely upon the type of knowledge it possesses.

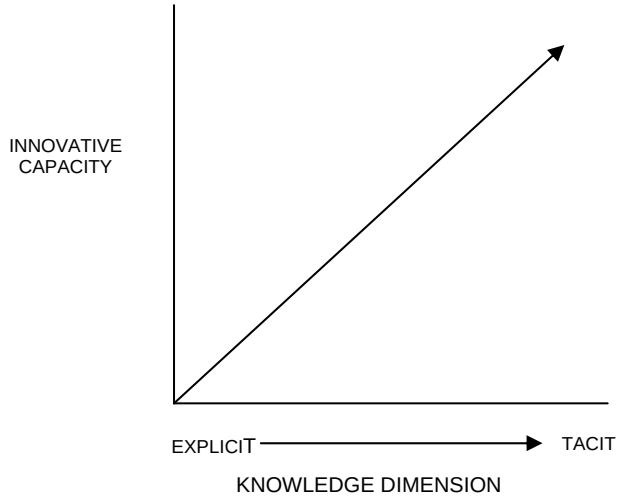


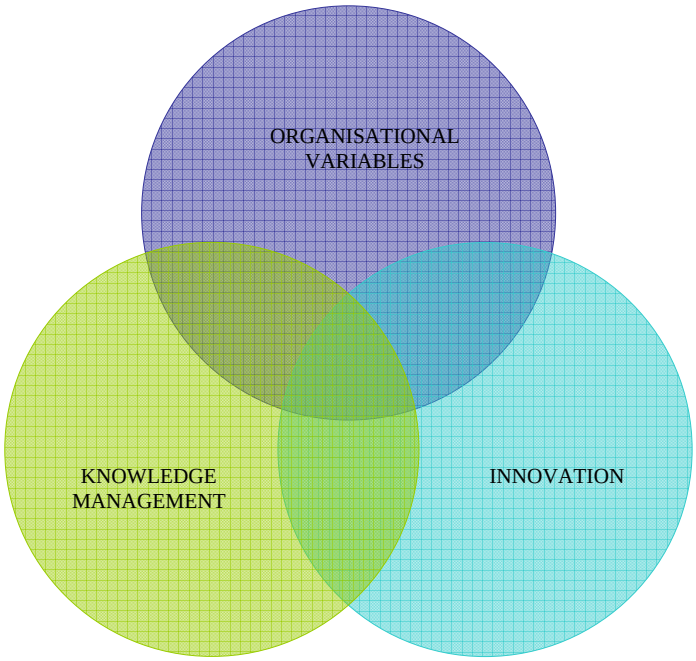
Fig. 2: Relationship between innovative capacity and knowledge dimension.

H2: There is a direct relationship between innovative capacity and the dimension of knowledge captured within an organisation.

H3: As knowledge moves from the explicit through to the tacit form, the innovative capacity of an organisation will increase.

Throughout the course of this study the validity of the models above will be tested, as will the hypotheses. It is also thought that there are several organisational variables that influence innovation and knowledge management. These will also be researched in more depth, with a framework illustrating the interplay between a number of complex parameters being developed.

Fig. 3: Relationship between knowledge management and innovation.



Based on preliminary studies, the most important of these variables can be expected to be size, age, organisational structure, culture and organisational slack. However, these required further testing before any statements as to the relative effect of each can be made.

CONCLUSIONS

In conclusion it can be stated that innovation and knowledge management should be viewed as important activities of the firm, as both can provide sustained competitive advantage. Indeed, it could be stated that it is not possible to succeed in today's knowledge-intensive global environment without the planned implementation of each. Nor would it be possible to achieve success by focusing solely on innovation or knowledge management. Early results from the study illustrate the symbiotic relationship between the two. It is expected that subsequent research will reinforce this further. For this reason, one of the key outputs of the study will be the development of a conceptual framework, thus allowing the dual relationship between the two to be examined in more detail. It is expected that vital components of this framework will include an organisation's structure and culture, as these are thought to impact directly upon an organisation's ability to innovate and capture knowledge.

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